Can an Out-of-Hospital Medication History Save Lives for Injured Older Adults?

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The purpose of field triage is to accurately identify high-risk trauma patients in the out-of-hospital setting for transport to major trauma centers, thereby connecting such patients to lifesaving resources and expertise without overwhelming these specialized hospitals. Although the concept of field triage is simple, it is complicated in practice. This complexity is in part the result of emergency medical services (EMS) resource constraints and lack of proximity to major trauma centers for a substantial portion of the US population. However, there are additional challenges. First, the definition of a "high-risk trauma patient" varies across studies and trauma systems, depending on a region's priorities, resources, and perspective, with some organizations focusing on the severity of injury[1] and others focusing on the need for timely specialized resources.[2] Second, identifying high-risk patients (however they might be defined) in the out-of-hospital setting has proven difficult. Despite multiple revisions to the Field Triage Decision Scheme during the past 30 years,[3] the national guidelines remain insensitive for identifying high-risk patients.[4-7] Finally, there is the practical issue of selecting a destination hospital, which requires consideration of proximity, traffic, weather, diversion status, and patient choice. The field triage of older adults is further muddled by subtle presentations of serious injuries, the highest rate of undertriage (seriously injured patients transported to nontrauma hospitals),[4,6,7] major differences in medical and surgical management compared with that of younger patients, and uncertainty in regard to the benefit of major trauma centers.[8,9] Multiple studies have explored triage criteria specific to older adults, with variable results.[4,10-12]

In this issue of *Annals*, Nishijima et al[13] present a much-needed study evaluating the use of anticoagulation and antiplatelet medications as an additional triage criterion to aid in the identification of older adults with intracranial hemorrhage. These medications have been associated with worse outcomes in patients with traumatic brain injury[14] and trauma in general.[15] In the most recent version of the Field Triage Decision Scheme, anticoagulation is listed as a "special consideration" (step 4 of the scheme), stating "Anticoagulation and bleeding disorders—Patients with head injury are at high risk for rapid deterioration."[16] However, until now the effect of this triage criterion has not been directly evaluated in the out-of-hospital setting. The current study suggests that formally integrating these medications into field triage may better identify older adults with intracranial hemorrhage,[13] yet there are important limitations to consider.

The limitations (many of which are recognized and discussed by the authors) include a single-county EMS system (generalizability); the focus on intracranial hemorrhage (field triage seeks to identify patients with serious injuries in *any* body region, not just the head); medication information obtained by hospital chart review rather than by EMS providers (the study group has demonstrated good agreement between EMS and hospital charts for warfarin, but not for other agents[17]); retrospective study design; the high proportion of patients transported to major trauma centers; and lack of formal integration of step 4 triage criteria into field triage processes for this region. This last limitation is notable because several of the step 4 criteria focus on older adults ("Risk of injury/death increases after age 55 years," "SBP [systolic blood pressure] <110 might represent shock after age 65 years," and "Low impact mechanisms [eg, ground level falls] might result in severe injury")[16] because such patients frequently do not have physiologic compromise (step 1), overt anatomic abnormalities (step 2), or high-velocity mechanisms of injury (step 3). However, none of the step 4 criteria mandate transport to a major trauma center. In this study, actual EMS transport patterns may approximate application of steps 1 through 4 in this region.

Not surprisingly, Nishijima et al found that the sensitivity of steps 1 to 3 for identifying older adults with intracranial hemorrhage was low, 19.8%.[13] Adding the use of anticoagulant and antiplatelet medications markedly improved sensitivity to 59.5%, which was similar to the sensitivity of actual EMS transport patterns to major trauma centers, 63.4%.[13] Including all patients transported to trauma centers plus those receiving one of these medications further increased sensitivity for identifying intracranial hemorrhage to 81.7%, with a reduction in specificity to 35.9%.[13] Although still not meeting the national target for triage sensitivity of greater than 95%,[1] this estimate would be a clinically important improvement over usual care. As proposed by Nishijima et al, a prospective study would offer important insight into how formal integration of anticoagulant and antiplatelet medications to the triage process might improve the matching of older adults with intracranial hemorrhage to major trauma centers.

These concerns notwithstanding, there are several important pearls that come out of this research. First, the study elucidates the prevalence of anticoagulation and antiplatelet use among injured older adults activating 911 (28%) and explores the potential role of these agents in the out-of-hospital identification of older adults with intracranial hemorrhage.[13] Studies using other populations and extrapolations from trauma registries have been used to approximate answers to these questions, but we believe this is the first study to directly evaluate these medications as potential triage tools in the out-of-hospital setting. Second, and perhaps less obvious, is the low interhospital transfer rate for patients with intracranial hemorrhage who were initially transported to nontrauma hospitals. Of the 48 patients with intracranial hemorrhage who were initially transported to nontrauma hospitals, only 6 (13%) were subsequently transferred to a major trauma center.[13] This finding is consistent with other research suggesting that secondary (hospital-based) triage and transfer processes are underused in patients with serious injuries.[7] One interpretation of these findings is that it is important to get field triage right because the initial receiving hospital will be the final hospital for most patients. An alternative interpretation is that policies and formal transfer agreements are needed to support secondary triage and transfer of high-risk patients. Finally, this study demonstrates the relatively low rate of neurosurgical intervention (including intracranial pressure monitoring) among older adults with intracranial hemorrhage (9 of 131 patients; 7%). Although not all patients with intracranial hemorrhage will require neurosurgical intervention, this rate seems particularly low and might suggest deficits in care for this population. Improving field triage will not fix all these issues, but creating processes that allow EMS providers to better identify older adults with serious injuries would be a step in the right direction.

A final aspect of field triage for older adults is patient decisionmaking and preference for certain hospitals. One previous study demonstrated that the majority of injured older adults accessing the 911 system request a specific hospital, which is frequently not a trauma center.[18] How often patient preference conflicts with field triage processes (ie, the patient meets field triage criteria but requests transport to a nontrauma hospital) is unknown. This phenomenon is also likely to affect interhospital transfer decisions, although studies exploring this issue are similarly sparse. As frequent users of the health care system, older adults may come to establish an informal "medical home" at a certain hospital, which could conflict with even the best field triage guidelines. In some cases, care at a local hospital of their choosing may actually be in the best interest of the patient (eg, in patients with advanced preexisting illness and preference for limited interventions). It is not clear whether patient preference affected field triage and interhospital transfer decisions in the current study. Understanding the role of patient preference in destination decisions among injured older adults and perhaps embracing shared decisionmaking between patients and EMS providers are important areas for future research.

This study helps fill a critical void in suggesting that a targeted medication history, formally integrated as a field triage criterion, may be useful in identifying high-risk older adults. Although there is language in the current triage guidelines about anticoagulation,[16] it is vague and leaves much of the decisionmaking up to the EMS provider. If prospective research and studies from other regions confirm the findings of Nishijima et al, more explicit language in the guidelines recommending trauma center transport for patients receiving these medications may be needed. It is clear from this study and others that the existing triage guidelines are woefully insufficient for identifying older adults with serious injuries. Older adults are not simply older versions of younger patients when it comes to identifying and managing serious injury. Improving the triage of injured older adults will require thinking differently about how we identify and care for these patients. It might be that a good medication history by EMS could, in fact, save lives.

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